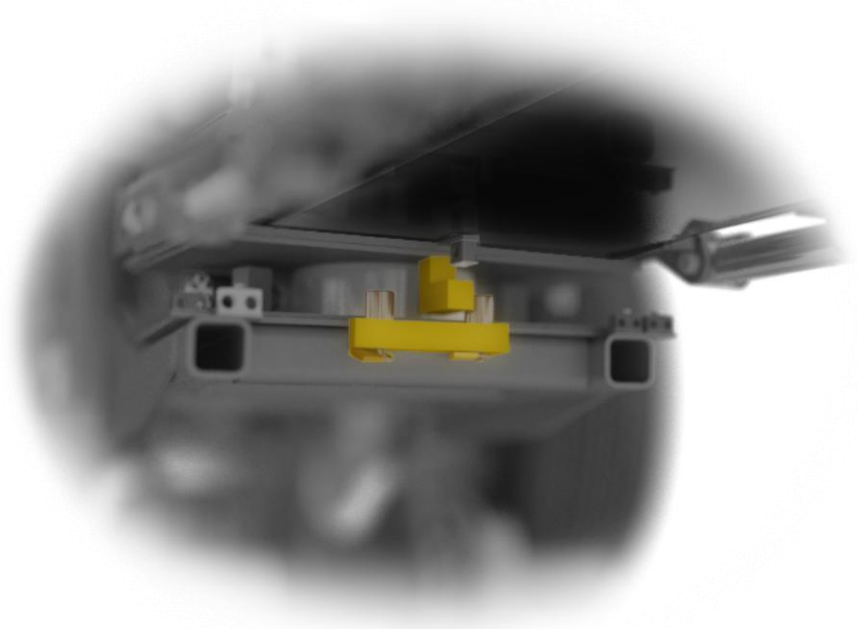


**OPERATIONS & MAINTENANCE:**  
**Rail-Ability Ballast Distributer**  
**Slew Limit System**



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## Introduction

This technical file documentation has been written by Rail-Ability to show compliance of the Rail-Ability mechanical slew limiting system to RIS 1530 issue 4 for ALO operation. The slew limiting system has been designed and manufactured by Rail-Ability Ltd to restrict the slew envelope of Road Rail converted ballast distributors to operate within the W6A gauge constraint when adjacent lines are open to traffic.

## Description

Rail-Ability Ltd have designed and developed a mechanical slew limiting system for use on Rail-Ability Ltd ballast distributors for rail use. The system utilises purely mechanical stops capable of repeatedly and safely limiting the slew in both clockwise and counter-clockwise directions of the ballast conveyor structure of the machine. The machine remains able to operate with standard slew capacity when the mechanical slew limiting system has not been engaged. When in operation with or without the slew limits in place the slew speed has not been reduced to give an unaffected working speed and no associated loss in productivity. When operating with the mechanical slew limits in place in any configuration the machine may operate on the railway line upon which it is running with conveyor working envelope available to facilitate works to the end of the sleepers at both rail heads of the line on which the machine is mounted. The slew-limiting device is lockable in the safe position to prevent unauthorised deactivation of the system and is also lockable in the disengaged position to prevent unauthorised separation of the limit pins from the machine. All components are life cycle analysed to give a minimum predicted life of  $4 \times 10^6$  repetitions. When operating in the most restricted configuration no part of the vehicle exceeds the standard W6A gauge of the line on which it is mounted. When operating with a single side restriction no part of the machine exceeds the W6A gauge on the restricted side enabling the machine to operate safely next to live traffic.

The mechanical stops are designed to be solely capable of preventing the machine from exceeding the set limits without sustaining or causing damage to the machine and without creating more than a nominal additional overturning moment. It should be noted that the negligible increase in overturning moments only occurs when the machine is in an inherently stable position over the chassis end.

### **Slew limit configurations:**

The mechanical slew stops have been positioned to limit the extremes of the ballast conveyor working envelope to the extremities of the W6A gauge tunnel as outlined in RIS 1530 Issue 4. On a 4m conveyor length, the limit is reached at 8° of slew from parallel with rail. This configuration of machinery limits the conveyor midpoint on the arm to an operating extremity of 608mm from the track centreline, giving a working envelope width of 1860mm to the extremities of the conveyor belt and 2792mm to the extremities of the conveyor structure, this allows the conveyor to work over the running rails of the machine.

When operating adjacent to non proximity open lines, a safe working practice must be adopted to prevent danger from the machine's 3.85m conveyor swing. Before the slew limit devices are set and the machine is deployed into a work site, a site survey must be conducted to ensure that the machine can operate safely without danger to the machine operator, other workers on site or passing traffic. For the SuperBoss Ballast Distributer, the maximum conveyer swing has been measured at 3.85m from rail centre. An additional factor of safety should be added to this value to give a minimum clearance from machine to the relevant dynamic gauge of the line open to traffic, given the nature of the machine and that ballast may travel after it has left the conveyor.

The site survey must therefore ensure there is sufficient track separation to allow the slew limiter not to be set on the respective sides of the machine to accommodate the machine conveyor swing on a line where an adjacent line is open to traffic. This, if available, will enable the conveyor arm to swing into the cess or a wide-way providing that there is adequate clearance.

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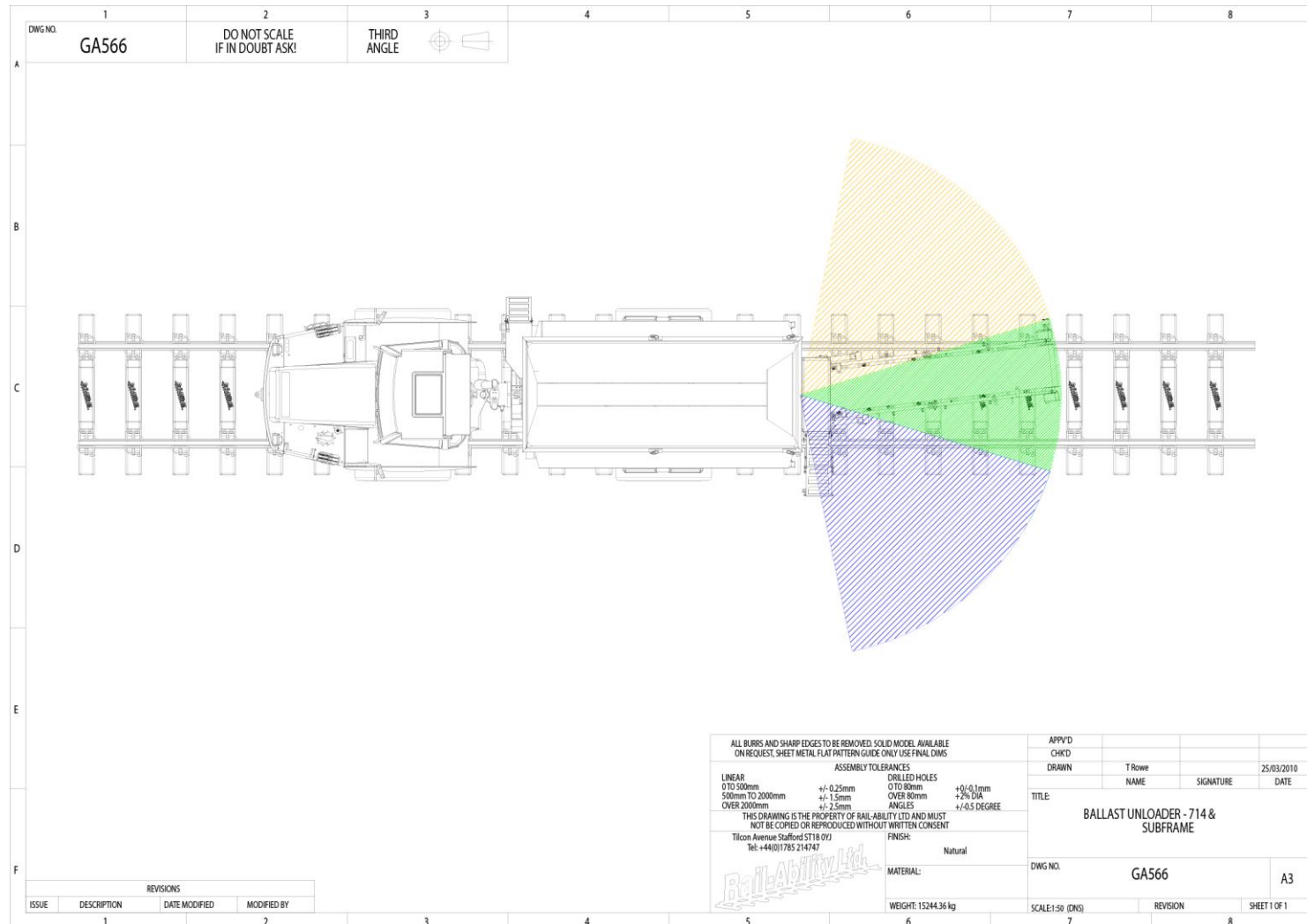
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## Working Envelops

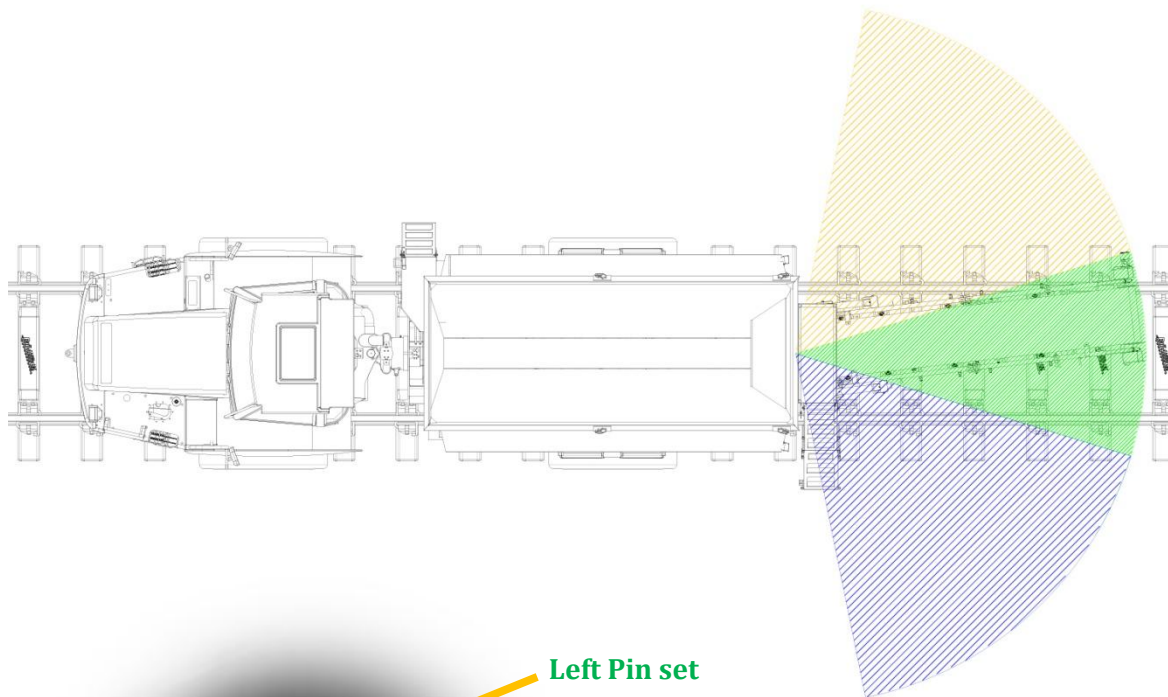


Both limit zones shown, the slew envelopes are symmetrical and the machine can work over both sides.

### Boom Working Envelope limits

*To set the rear conveyor limits:*

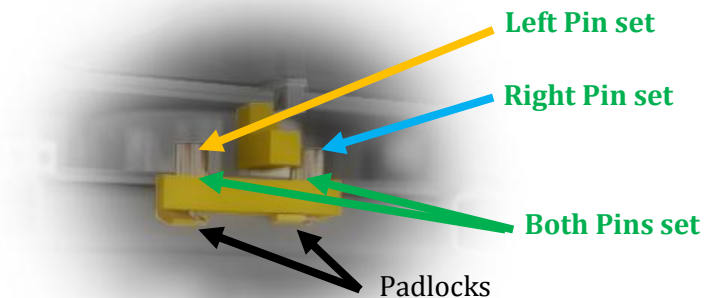
1. Slew the rear conveyor parallel to the machine, straight, directly over the rear.
2. Line up the required locking pin(s) and engage.
3. Padlock the pin(s) in place.



Green & Orange Sector: Available conveyor envelope with left slew limiter pin set and locked. (Left W6A Gauge compliant)

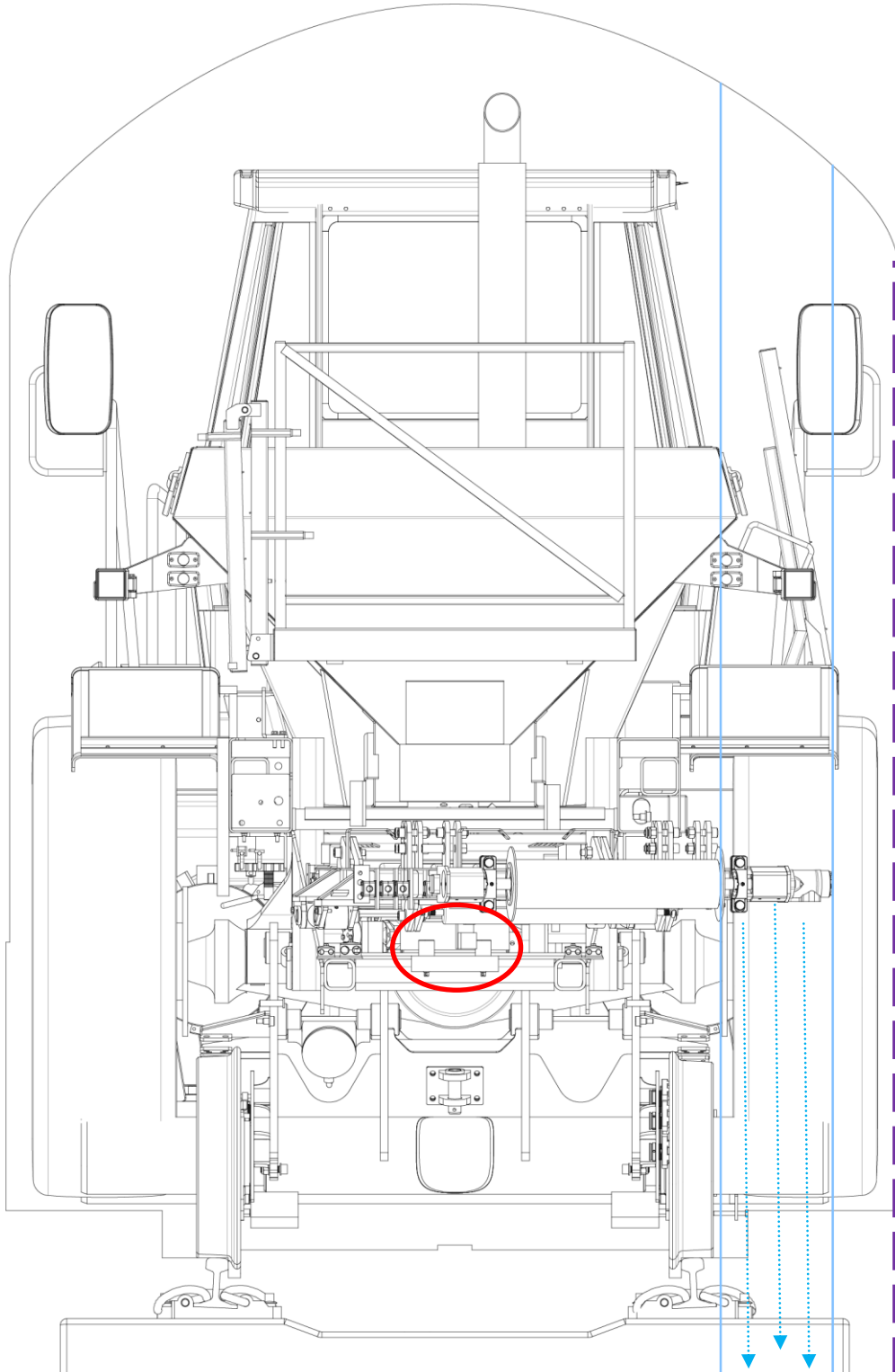
Green Sector: Available conveyor envelope with BOTH slew limiter pins set and locked (Fully W6A Gauge compliant)

Green & Blue Sector: Available conveyor envelope with right slew limiter pins set and locked. (Right W6A Gauge compliant)





## Slew limit in W6A gauge



SuperBoss fitted with ballast distributor, inside W6A gauge tunnel. Red oval highlights the ALO MLD mechanical slew stop system.

Blue lines indicate maximum right hand offset of ballast placement with right hand pin set.

Purple dashed line indicates the rear conveyor reach extremities with right hand pin set.

## ROUTINE MAINTENANCE PLAN AND SCHEDULE

Component Asterisked (*) Job Ref is Safety Critical	Activity	Who	Periodicity				Job Ref
			PU	RET	HOUR	MTH	
Slew limiter pins	Check	DRV	*				*SL01

### SCHEDULED WORK:

1. Slew the rear conveyor parallel to the machine, straight, directly over the rear.
2. Line up locking pins and engage.
3. Inspect the Slew limiter equipment whilst loading and unloading structure with the slew controls, check integrity of structure,
4. Inspect all pins and holes for wear or ovality.

### REMEDIAL ACTION:

2. Report if pin will not engage.
3. Report if structure is cracked, deformed or damaged.
4. Pins should be nominal diameter +0.0mm – 1.0mm and should be renewed if worn by 1.0mm. Holes should be nominal diameter +0.5mm – 0.0mm and should be bushed if wear exceeds 2mm.

### Engineering Drawings:

